REMARKS

Claims 1 and 8 have been amended by limiting the DLC to at least one of a-C (amorphous carbon) DLC and a-C:H (hydrogenated amorphous carbon) DLC. The support for this amendment is found on page 7, lines 13 to 15 and in the Examples of the specification.

Claims 1-2, 5-8, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyake et al., JP Publication No. 2001-316686, in view of Yagishita, US Patent Application Publication No. 2005/0272616.

The Examiner argues that Miyake discloses a system having a pair of DLC contacting faces at least one of which is coated with a DLC film and is suitably used in a lubricant such as an engine and transmission oil. The disclosed lubricant contains a mineral or synthetic base oil, and additives including molybdenum dithiocarbamate (corresponding to component (B) of the present invention) and zinc dithiophosphate (corresponding to component (E) of the present invention). The Examiner recognizes that Miyake does not disclose a friction modifier (component (C) of the present invention) and a metal detergent (component (D) of the present invention).

The Examiner also argues that Yagishita discloses a lubricant composition for use in an internal combustion engine comprising a particular base oil including component (X) of the present invention, and additives including neutral alkaline earth metal salicylates (corresponding to component (D) of the present invention), particular friction modifier (corresponding to component (C) of the present invention), and anti-wear additives including metal phosphates (corresponding to component (E) of the present invention). In other words, the Examiner construes Yagishita as disclosing all the components of the lubricant of the present invention except for component (B).

Based on the above, the Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to use the base oil and additives of Yagishita in the composition of Miyake because all the additives are very well known in the art and would

conventionally be used to enhance friction, detergency and anti-wear properties in the composition.

The Applicants respectfully disagree with the Examiner's conclusion.

Miyake teaches that conventional hard carbon films, i.e., a-C (amorphous carbon) based DLC, have solid lubricity and thus exhibit very low friction without a lubricant, compared to conventional hard films having no solid lubricity and formed by, e.g., titanium nitride (TiN) or chromium nitride (CrN) ion plating. However, in a lubricant, the a-C based DLC merely exhibits friction comparable to that of the hard films without solid lubricity. See paragraphs [0002], [0007], [0009]-[0010], and [0021].

Miyake aims to solve this problem by adding 5 to 70 at% of particular metal elements to the hard carbon films. The hard carbon films of this type are MeC (metal carbide) DLC as described on page 7, lines 15 to 17 of the present specification.

In sum, Miyake teaches that it is better not to use a lubricant with a-C based DLC sliding members, and thus teaches away from the present invention.

On the other hand, the DLC in the present invention has been limited to a-C and/or a-C:H DLC, which is disclosed in Miyake to raise problems when used in a lubricant. Surprisingly, according to the present invention, the particular lubricant further lowers the friction of a-C based DLC sliding members. See Examples and Comparative Examples.

Incidentally, Yagishita is silent about coating sliding members with a-C based DLC.

Therefore, the present invention would not have been obvious over Miyake in view of Yagishita.

The Examiner argues on page 7, lines 11 to 13 of the Office Action that the example oils

also use friction modifiers that are currently outside the scope of the amended, independent claims. Applicants note that the friction modifier (C) used in the Examples is glycerin monooleate, which falls under the category of "C1-C40 esters" in the friction modifier (C) defined in claims 1 and 8 (see also claims 21 and 22).